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28 May 1962

MEMORANDUM FOR: Chief, Technical Plans & Development Staff *JWC*
THROUGH: Acting Chief, Technical Development Branch *MWIK*
28 MAY
25X1A SUBJECT: Evaluation of [REDACTED] Panoramic Convergent Stereo Viewing Experiment

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1. On a visit to the [REDACTED] plant, 15-16 May 1962, the undersigned observed a demonstration of the feasibility of projecting panoramic stereo convergent photography for stereoscopic scanning.

2. The experiment demonstrated feasibility for scanning about 25° each side of nominal center of a panoramic convergent stereo pair, but also demonstrated a number of serious limitations to such a scanning system. The limitations can be overcome by known technology. However, an acceptable viewer would be extremely expensive and sophisticated and would probably require a specially trained operator in addition to the photo interpreter.

3. An optical-mechanical version of the viewer would automatically correct for only the ideal view for which the camera system was designed. In practice, this condition almost never occurs and the operator would be required to manually make up to 17 adjustments for variables inherent in convergent panoramic stereo viewing. Under these conditions the operator could easily become obsessed with achieving the stereo model and allow significant imagery to slip by.

4. A computer-controlled version of the viewer could be fabricated which would automatically adjust for all variables and maintain a satisfactory stereo model. The procedure would involve preparation of a computer program for each half frame to be viewed. The output of the computer would then operate servo mechanisms capable of making adjustments to match the taking conditions for each half frame.

5. The variables adjusted during viewing in the experimental mock-up were:

- (a) Focus on each projector.
- (b) Image rotation on each projector.
- (c) Image inversion between the two halves of the panoramic sweep.

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- (d) Horizontal transfer of image position.
- (e) Vertical transfer of image position.
- (f) "Y" parallax rectification by tilting the viewing screen.
- (g) Variation of projection lamp intensity.

(h) Three additional adjustments on each projector, not demonstrated during the experiment, would be desirable. Image size, to correct for yaw or tilt differences; convergence angle, to correct for pitch; and projection lens rotation around its nodal point to satisfy the Scheimpflug condition and produce a sharp image.

6. Human factors studies on the value of stereoscopic viewing seem to indicate that there is very little advantage in the scanning operation in stereo as opposed to non-stereo scanning. Since the findings in human factors research are not yet conclusive, positive rejection of stereo scanning systems is not contemplated at this time. However, before new display equipment of the complexity envisioned for stereo scanning is developed, the need for the stereo capability should be clearly demonstrated.

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7. The [REDACTED] experiment demonstrated feasibility within limits and represents valuable knowledge in the field of stereo viewing. However, equipment development based on the experiment would be premature at this time.

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